

# NORTHERN SQUAWFISH MANAGEMENT PROGRAM

9007700

## SHORT DESCRIPTION:

Implement squawfish management program to reach predation control goals; evaluate squawfish population response; improve salmonid survival at mainstem hydro facilities.

## SPONSOR/CONTRACTOR: PSMFC

Pacific States Marine Fisheries Commission  
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## SUB-CONTRACTORS:

Oregon Department of Fish & Wildlife Washington  
Department of Fish & Wildlife Columbia Basin Fish &  
Wildlife Authority Columbia River Intertribal Fish  
Commission Confederated Tribes of the Umatilla Indian  
Reservation Confederated Tribes of the Warm Springs  
Reservation of Oregon Nez Perce Tribe Yakama Indian  
Nation

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## GOALS

### GENERAL:

Increases run sizes or populations

### ANADROMOUS FISH:

Production

### RESIDENT FISH:

Production

### NPPC PROGRAM MEASURE:

5.7B.1

### BIOLOGICAL OPINION ID:

NMFS BO RPA Sec. 14

### TARGET STOCK

Northern Squawfish

### LIFE STAGE

Adults over 11 inches

### MGMT CODE (see below)

### AFFECTED STOCK

All Salmonids

### BENEFIT OR DETRIMENT

Beneficial

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## BACKGROUND

### STREAM AREA AFFECTED

#### Stream name:

Columbia & Snake Rivers

#### Stream miles affected:

Mouth to Priest Rapids & Hells Canyon Dams

#### Hydro project mitigated:

Bonneville, The Dalles, John Day, McNary, Priest  
Rapids; Ice Harbor, Lower Monumental, Little Goose,  
Lower Granite, Hell's Canyon

### HISTORY:

1990: \$1,421,813; 1991: \$5,259,629; 1992: \$6,846,410; 1993: \$4,253,600; 1994: \$3,670,708 + \$600,000 reward contract;  
1995: \$4,100,000; 1996: \$3,846,248; 1997: \$3,700,000 [Proposed]

The purpose of the project is to test a hypothesis based on research in John Day Reservoir by ODFW from 1982 through 1988 that indicated through modeling simulations that a 10-20% exploitation rate on northern squawfish would result in up to a 50% reduction in predation on juvenile salmonids.

### **BIOLOGICAL RESULTS ACHIEVED:**

This project has removed over 977,000 predator-sized northern squawfish from the mainstem Columbia River since 1990 with 217,000 of those removed in 1995 for an exploitation rate of 15.6% in 1995. The projected reduction in predator caused juvenile salmonid mortality is estimated at 36% for 1996 when compared to pre-program levels. If harvest rates similar to 1995 continue, a 41% reduction in the consumption of juvenile salmonids by northern squawfish is estimated by 1998.

### **PROJECT REPORTS AND PAPERS:**

Quarterly and annual reports available.

### **ADAPTIVE MANAGEMENT IMPLICATIONS:**

The dam-angling fishery element of this project had demonstrated that northern squawfish numbers are greatly reduced in the powerhouse tailrace during periods of heavy spill most likely because of reduced prey abundance.

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## **PURPOSE AND METHODS**

### **SPECIFIC MEASUREABLE OBJECTIVES:**

The overall objective is to reduce northern squawfish predation on juvenile salmonids by a sustained removal of 10-20% of the predator sized (11 inches or larger) northern squawfish annually.

### **CRITICAL UNCERTAINTIES:**

The critical uncertainty is whether the desired 10-20% exploitation rate on northern squawfish can be maintained for the long term.

### **BIOLOGICAL NEED:**

The biological need is based on the results of eight years of research in John Day Reservoir which determined that reservoir mortality was caused primarily by predation and that northern squawfish were responsible for 80 % of all aquatic predation.

### **HYPOTHESIS TO BE TESTED:**

The testable hypothesis is that a sustained annual exploitation rate of 10-20% on northern squawfish will result in up to a 50% reduction in juvenile salmonid consumption by northern squawfish after 5 years of implementation.

### **METHODS:**

Northern squawfish are being removed through a sport reward fishery, a dam-angling fishery and site specific (tributary mouth) gill-net fisheries. Evaluation is based on sustained exploitation rate and size composition of harvested northern squawfish and estimated reduction in predation on juvenile salmonids. This required information on changes in relative abundance, consumption, size and age structure, growth, and fecundity of northern squawfish in the mainstem Snake and Columbia rivers. Statistical analysis is conducted on all variables measured.

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## **PLANNED ACTIVITIES**

### **SCHEDULE:**

### **CONSTRAINTS OR FACTORS THAT MAY CAUSE SCHEDULE OR BUDGET CHANGES:**

All fisheries take both juvenile and adult salmonids listed as threatened or endangered and are constrained by the biological opinion.

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## **OUTCOMES, MONITORING AND EVALUATION**

### **SUMMARY OF EXPECTED OUTCOMES**

**Expected performance of target population or quality change in land area affected:**

We believe that the exploitation rate achieved during 1995 (15.6%) can be sustained with the current funding level. This is projected to result in a sustained reduction in juvenile salmonid consumption by northern squawfish of 41%.

**Contribution toward long-term goal:**

Reduce northern squawfish predation on Columbia Basin downstream migrant salmonids by 50%.

**Coordination outcomes:**

FY 1995 and beyond: 1) Continue implementation of squawfish management throughout the Lower Columbia and Snake Rivers to reduce predation mortality; 2) evaluate the effectiveness of squawfish management in reducing predation mortality, including assessment of squawfish age/size structure, growth, fecundity, and mortality, consumption of juvenile salmonids by squawfish and other resident fish predators, and effects of squawfish management on juvenile fish survival; 3) continue to assess opportunities to increase exploitation rates and overall benefit to juvenile fish survival resulting from squawfish management efforts.

**MONITORING APPROACH**

Northern squawfish are being removed through a sport reward fishery, a dam-angling fishery and site specific (tributary mouth) gill-net fisheries. Evaluation is based on sustained exploitation rate and size composition of harvested northern squawfish and estimated reduction in predation on juvenile salmonids. This required information on changes in relative abundance, consumption, size and age structure, growth, and fecundity of northern squawfish in the mainstem Snake and Columbia rivers. Statistical analysis is conducted on all variables measured.

**Provisions to monitor population status or habitat quality:**

ODFW conducts ongoing population studies on Northern Squawfish in the mainstem Columbia and Snake Rivers. These studies measure population and fecundity response to removals of Northern Squawfish and reduction in salmonid predation by Northern Squawfish as a result of this project.

**Data analysis and evaluation:**

By statistical models and standard fisheries population techniques.

**Information feed back to management decisions:**

By means of annual reports prepared at the end of each season and public meeting reviews of seasonal findings with FPAC and NMFS.

**EVALUATION****Increasing public awareness of F&W activities:**

The public participates in this project and receives information through participation, sportmen's shows and newspaper coverage.

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**RELATIONSHIPS****RELATED BPA PROJECT****RELATIONSHIP**

Projects related to flow augmentation, spill, and mechanical bypass achieve the same biological objective of improving downstream migrant survival.

**OPPORTUNITIES FOR COOPERATION:**

Requirements to increase the sustainable exploitation rate (such as the NPPC's Fish and Wildlife Program's requirement to exceed 20% exploitation rate) would substantially increase program costs. In the past, delays in the receipt of a biological opinion threatened our ability to tag numbers of northern squawfish needed to measure exploitation rates of the various fisheries

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## COSTS AND FTE

**1997 Planned:** \$3,450,000

### FUTURE FUNDING NEEDS:

<u>FY</u>	<u>\$ NEED</u>	<u>% PLAN</u>	<u>% IMPLEMENT</u>	<u>% O AND M</u>
1998	\$4,000,000			
1999	\$4,200,000			
2000	\$4,400,000			
2001	\$4,600,000			
2002	\$4,800,000			

### PAST OBLIGATIONS (incl. 1997 if done):

<u>FY</u>	<u>OBLIGATED</u>
1990	\$1,421,813
1991	\$5,259,629
1992	\$6,846,410
1993	\$4,253,600
1994	\$3,670,708
1995	\$4,311,186
1996	\$3,657,627

TOTAL: \$29,420,973

Note: Data are past obligations, or amounts committed by year, not amounts billed. Does not include data for related projects.

**LONGER TERM COSTS:** \$4.8 million - operation of project

**1997 OVERHEAD PERCENT:** 15% for direct work; 2% for contracted work

### HOW DOES PERCENTAGE APPLY TO DIRECT COSTS:

Total project, excluding equipment

**CONTRACTOR FTE:** 3 people totaling 1.1 FTE's

**SUBCONTRACTOR FTE:** 88 people totaling 44.4 FTE's

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